ALCOHOL AND DRUG PREVALENCE IN OCCUPATIONAL FATALITIES IN ALBERTA 1979-1983

1438C
July 1985

Alcohol and Drug Prevalence in Occupational Fatalities in Alberta 1979-1983

B.C. ALLEYNE, M.Sc.; G. JAMIESON, M.D.; J. KALNAS, M.D.; and R.R. ORFORD, M.D.[1]

Presented at the 34th International Congress on Alcoholism and Drug Dependence, August 4 to 10, 1985, Calgary, Alberta, Canada

Present Address is: [1] Social Services and Community Health, 10th Floor, Seventh Street Plaza, 10030 - 107 Street, Edmonton, Alberta, T5J 3E4

Author to whom requests should be addressed:
B.C. Alleyne, F.I.M.L.S., M.Sc.
Medical Services Branch
Workers' Health Safety and Compensation
10709 Jasper Avenue
EDMONTON, Alberta
T5N 3N3

ABSTRACT

The relationship between alcohol, drug abuse and industrial accidents is an area of interest to all concerned with occupational health and safety. The belief that alcohol and drug abuse is a possible cause of industrial accidents is widespread, but lacks supporting evidence.

We have initiated an ongoing review of data from toxicological investigations (for alcohol and drugs in body tissues) of industrial fatalities. Information is collected on occupation, age, sex, type of accident, drugs detected and alcohol levels. The monitoring system will be discussed and the results from 339 cases collected during 1979-1983 will be presented.

INTRODUCTION

The relationship between alcohol, drug abuse and industrial accidents is an area of interest to all concerned with occupational health and safety. There is a persistent belief that industrial accident rates are higher in alcohol and drug users, but evidence to support or negate this opinion is scarce. Faced with this deficiency, researchers have tried several different approaches to estimate the prevalence of the problem in both the general population and in industry.

Lewy[1] used a pre-employment qualitative urine toxicological drug screening procedure on 500 prospective hospital employees and found that 33 (6.6%) of them were positive for either valium, barbiturates, amphetamines, phencylidine or opiates. However, 13 (2.6%) of those screened were confirmed to be true positives when referred to a reference laboratory for confirmatory testing and only one person was not hired. Because of its low yield, Lewy concluded that a pre-employment screening approach, is not a cost effective procedure. The use of such pre-employment screening has also been questioned on the basis of concerns about the infringement of workers' rights[2].

Despite its limitations self-reporting is another approach that has been tried. Using this approach Mott[3] found that five percent of a sample of persons 16 years or older reported that they had ever used cannabis. The highest proportion of both males and females who said they had ever used cannabis was found in the 25-34 age group.

Schmidt and deLint[4] estimated the prevalence rate of alcoholism in Ontario by using alcohol consumption data, death rates from liver cirrhoses and death rates from suicide (assuming that alcoholism and suicide are closely related). All three methods produced a similar estimate of approximately 1.7%. In another study, Greg et al[5] used two methods; one based on average per capita consumption and the other using a questionnaire. Both methods produced almost identical results and showed that approximately 18% of the military personnel on a Canadian Armed Forces air base consumed alcohol at or above a level that is thought to be hazardous to health. Although employment on a military base maybe considered to be unique, Schuckit and Grunderson[6] have shown that there are many similarities between certain military and civilian occupations and that in those occupations there are more drinkers.

Despite these efforts, a reliable estimate of alcohol and drug abuse in the work place still remains an unknown factor. We, like Shain [7] are unaware of many studies that have properly investigated the

relationship between industrial accidents and substance abuse.

In Alberta all non-highway related, fatal accidents within the jurisdiction of Alberta's Occupational Health and Safety Division are carefully investigated by a Significant Incident Review Board (SIRB). This evaluation process includes the review of toxicological information made available by the Medical Examiner's Office. Using this data base we have initiated an ongoing study to determine the frequency with which alcohol and drugs are associated with occupational fatalities. This report summarizes our findings to date, based on 339 cases reviewed from 1979-1983.

METHODS

Toxicological reports on occupational fatalities that occurred in Alberta between January 1, 1979 and December 31, 1983 were reviewed and age, sex, occupation, accident type and the presence and level of alcohol or drugs were recorded. Drugs other than alcohol were classified as either prescription, non-prescription or illicit. Included in the group of illicit drugs were cannabinoids, cocaine or amphetamines. Occupation codes used were based on the Canadian Classification and Dictionary of Occupations,[8] while accident types were coded following the American National Standard Method for Recording Basic Facts Relating to the Nature and Occurrence of Work Injuries.[9]

RESULTS

The fatalities were predominantly males with a mean age of 32 years, with 22 years being the most frequently occurring age. The other general findings of the review are summarized in Table 1.

Out of the 339 fatalities, toxicologic tests were done in 254 cases. Most of the 85 cases on which tests were not done, were fatalities between 1979 and 1980 when routine screening of industrial fatalities was not yet formalized. Presence of alcohol was reported in 42 (16.5%) cases. The distribution of the alcohol levels are shown in Table 2. Of the 42 cases, 30 (71%) had alcohol levels less than 80 mg/100 ml, the legal definition of impairment for driving automobiles.

The drugs, other than alcohol, that were detected in 36 (14.2%) cases were grouped under the major headings of cannabis, antihistamines, pain killers or barbiturates and diazepams. Drug Combinations were found in 7 cases, and these are listed in Table 3.

A large variety of occupations were represented in the fatalities reviewed. There were, however, seven specific occupations, shown in Table 4, in which 10 or more fatalities occurred during the five year

period. When the occupations with 10 or more accidents were correlated to the type of accident, as shown in Table 5, *"struck by" "motor vehicle accidents"* and *"falls"* three were the three prime types of accidents.

When the accident types were correlated with the presence or absence of alcohol, *"falls"* and *"motor vehicular accidents"* were the two accident types that occured more frequent where alcohol was detected. This association was further strengthened when the accident types were correlated with alcohol levels less than or greater than 80 mg/100 ml. The numbers are, however, too small for reliable statistical analysis. These results are shown in Tables 6 and 7.

Although there were only 36 cases where drugs other than alcohol were identified, a correlation between accident type and the presence of a drug other than alcohol was attempted. The analysis showed that *"cave-ins"* and *"caught in or under"* were the accident types which were proportionately more frequent where drugs were detected. However, when drugs which are pain kilers and prescription drugs are discounted there remained only six instances in which an illicit drug (cannabis) was found. In these, six different occupations and five types of accidents were identified. Only motor vehicle accidents were duplicated.

DISCUSSION

Although alcohol was detected in 42 (16.5%) fatalities, only 12 (4.7%) had alcohol levels in excess of the legal limit of 80mg/100ml. The figure of 4.7% is very similar to the figure of 3.0% reported by Lings et al[10] and 4.0% reported by Manello[11], but much less than the 20% quoted by Travis[12].

Data for drugs other than alcohol, especially for cannabis, is very tenuous. The six cases are too few to allow any valid inferences to be made. The Medical Examiner's Office has also informed us that in the past although toxicological samples may have been collected, routine tests for illicit drugs such as cannabinoids were not always performed on industrial fatalities. Currently all industrial deaths will have samples analysed. For this reasons no inferences can be made about the prevalence of cannabinoids in occupational fatalities at this time. The drugs other than cannabis that were detected were predominantly pain killers. They were found proportionally more frequently in cases that were victims of cave-ins or were caught in or under equipment. This association is consistent with attempts to lessen the pain of such victims while conveying them from worksites to hospitals, therefore it would appear that the drugs found in these cases have not contributed to

the cause of the accident. The six cases in which cannabis was identified did not cluster around any particular type of accident or occupation.

The type of accidents that were found most frequently associated with elevated alcohol levels, falls and motor vehicular accidents, are ones where interference with coordination could contribute to the accident. It is well known that alcohol does interfere with coordination. Although the numbers are to small for statistical analysis this finding adds to the internal validity of the data.

Our results indicate that the data base being used is capable of generating information which has the potential to provide useful estimates of the prevalence of drugs or alcohol in occupational fatalities in Alberta. Estimates for illicit drugs such as cannabis should also be possible as better drug screening methods and protocols are developed. Cimbura et al[13], using traffic fatality data from Ontario, has been able to determine that 12% of all victims of fatal traffic accidents in a year were drug related, and that in approximately one-third of these, cannabis was the only drug found. As we collect more data, we hope that our on-going study will yield a better understanding of the contribution of alcohol and drug abuse to industrial accidents.

ACKNOWLEDGEMENTS

We thank the occupational health nurses, Marlene Gray and Peggy Szumlas for their assistance with collecting the data; Blair MacKinnon for his assistance with the SPSS programs; Patricia Stuart for the preparation of the code sheet and coding manual; the Work Site Services Inspectors for their general assistance and Deb Kakoschke for the preparation of the manuscript.

REFERENCES

1. Lewy, Robert, Pre-Employment Qualitative Urine Toxicology Screening, J.O.M. Vol 25, No. 8, p. 579-580. August 1983.

2. Atherley, G., Human Rights versus Occupational Medicine, Internat. J. Health Services, 13:(2)265-75. 1983.

3. Mott, Joy, Self-Reported Cannabis Use in Great Britain in 1981. Brit. J. of Addiction, 80, p. 37-43. 1985.

4. Schmidt, W. and deLint J., Estimating the Prevalence of Alcoholism from Alcohol Consumption and Mortality Data, Quar. J. Stud. Alc. 31, p. 957-64. 1970.

5. Gray, R.H., Poudrier, L.M. et al, Convergent Results of Two Methods of Estimating the Prevalence of Problem Drinking, J.O.M. Vol. 25 #7, p. 531-533. 1983.

6. Schuckit, M.A. and Grunderson, E.K.E., The Association Between Alcoholism and Job Type is the U.S. Navy, Quart. J. Stud. Alc. Vol. 35, p. 577-585. 1974.

7. Shain M, Alcohol, Drugs and Safety an updated perspective on problems and their management in the workplace. Accid Anal and Prev Vol 14 No 3, p.239-46.

8. Canada Classification and Dictionary of Occupations Vol 1, Manpower at Immigration Canada Ottawa K1A 0S9. 1971

9. American National Standard Method of Recording basic Facts Relating to the Nature and Occurrence of Work Injuries. American National Standard Institute, Inc 1962

10. Lings, S., Jensen, J., Christensen, J.S. and Moller, J.T., Occupational Accidents and Alcohol, Int. Arch. Occup. Environ. Health, p. 321-329. 1984.

11. Manello, T.A., Problem Drinking Among Railroad Workers: Extent, Impact and Solutions, University Research Cooperation Monograph Series #4, 5530 Wisconsin Avenue N.W., Washington D.C. 20015. 1979.

12. Travers, D.J., Industrial Accidents and Problem Drinking, AJADD, Vol. 2, No. 2, p. 39-40. May 1975.

13. Warren, R., Simpson, H.M. et al, Drug Involvement Traffic Fatalities in the Province of Ontario, American Association for Automotive Medical Procedings October 7-9, 1980.

TABLE 1

GENERAL FINDINGS OF THE TOXICOLOGY SCREENING

n=254

	#	%
Number of cases in which alcohol was detected	42	16.5
Number of cases in which a drug (other than alcohol) was detected	36	14.2
Number of cases in which an illicit drug was identified	6	2.4
Number of cases in which drug was a prescription drug[2]	23	9.1
Number of cases in which drug was a non-prescription drug	9	3.5

FOOTNOTES

[1]Cannabis was the only illicit drug detected.

[2]There were cases in which more than one drug was detected.

TABLE 2

DISTRIBUTION OF ALCOHOL CONCENTRATION

n=42

ALCOHOL LEVEL mg/100 ml	#	%
10 or Less	26	61.9
11 - 79	4	9.57
80 - 170	5	11.9
171 - 284	5	11.9
285 - 340	2	4.8

TABLE 3

DRUG COMBINATIONS IDENTIFIED BY TOXICOLOGICAL SCREEN

(7 CASES)

CASES	DRUG COMBINATIONS
#1	Amobarbital Secobarbital
#2	Theobromine Salicylic Acid
#3	Phenobarbital Diphenylhydantoin
#4	Codein Acetaminophen
#5	Tetracycline Cannabis
#6	Lidocaine Diazepam Nordiazepam
#7	Theophylline Pheniramine Chlorpheniramine Phenylpropanolamine

TABLE 4

OCCUPATIONS WITH 10 OR MORE FATALITIES

n=339

OCCUPATION	#	%
DERRICK MAN	39	11.5
TRUCK DRIVER	33	9.7
CONSTRUCTION LABOURER	33	9.7
GRADING OPERATOR	22	6.5
LOGGER, FALLER, etc.	12	3.5
PLUMBER/PIPEFITTER	11	3.2
WELDER	10	2.9

TABLE 5

OCCUPATIONS WITH 10 OR MORE FATALS BY ACCIDENT TYPE

OCCUPATIONS	# OF ACCIDENTS	ACCIDENT TYPES								
		STRUCK BY	FALLS	CAUGHT IN ETC.	CONTACT ELECTRIC POWER	CONTACT TOXIC	MOTOR VEHICLE	FIRE	EXPLOSION	UNCLASSIFIED
7711-DERRICK MAN	# 39 %	17 (43.6)	8 (22.2)	4 (11.1)	2 (5.1)	3 (7.7)	2 (15.11)	2 (5.1)	1 (2.6)	-
9179-TRUCK DRIVER	# 33 %	3 (9.1)	4 (12.1)	4 (12.1)	7 (21.2)	3 (9.1)	11 (33.3)	-	-	1 (3.0)
8718/98-LABOURER	# 33 %	5 (15.2)	9 (27.3)	5 (15.2)	2 (6.1)	3 (9.1)	7 (21.2)	-	1 (3.0)	1 (3.0)
8711-EXCAVATION/ GRADING OPERATOR	# 22 %	-	-	6 (27.2)	-	1 (4.5)	14 (63.6)	1 (4.5)	-	-
7513-LOGGER/FALLER	# 12 %	8 (66.6)	2 (16.9)	-	-	-	2 (16.7)	-	-	-
8791-PLUMBER/ PIPEFITTER	# 11 %	3 (27.3)	2 (18.2)	3 (27.3)	-	1 (9.1)	-	-	2 (18.2)	-
8335-WELDER	# 10 %	2 (20)	2 (20)	-	1 (10)	3 (30)	1 (10)	1 (10)	-	-
TOTAL	160	38	27	22	12	14	37	4	4	2

TABLE 6

ACCIDENT TYPE

BY PRESENCE OR ABSENCE OF ALCOHOL

	ALCOHOL DETECTED			
	YES		NO	
ACCIDENT TYPE	#	%	#	%
STRUCK BY	8	19	40	20
FALLS	10	23.8	30	15
CAUGHT IN, UNDER, etc.	4	9.5	35	17.5
ELECTRICAL CONTACT	2	4.8	18	9
CONTACT WITH TOXICS, etc.	3	7.1	21	10.5
MOTOR VEHICULAR ACCIDENT	13	31	34	17
FIRE	0	0	1	0.5
EXPLOSIONS	1	2.4	6	3.0
CAVE-INS	0	0	5	2.5
UNCLASSIFIED ACCIDENTS	1	2.4	10	5.0
TOTAL	42	100	200	100

TABLE 7

ACCIDENT TYPE BY ALCOHOL LEVELS

n=42

	ALCOHOL LEVELS			
	<80mg/100ml		≥80mg/100ml	
ACCIDENT TYPE	#	%	#	%
STRUCK BY	7	23.3	1	8.3
FALLS	4	13.3	6	50
CAUGHT IN, UNDER, etc.	4	13.3	0	-
ELECTRICAL CONTACT	2	6.6	0	-
CONTACT WITH TOXICS, etc.	3	10	0	-
MOTOR VEHICULAR ACCIDENT	8	26.6	5	41.7
FIRE	0	-	0	-
EXPLOSIONS	1	3.3	0	-
CAVE-INS	0	-	0	-
UNCLASSIFIED ACCIDENTS	1	3.3	0	-